EXHIBIT 5

2017-2544

In The

United States Court Of Appeals For The Federal Circuit

PUREPREDICTIVE, INC.,

Plaintiff – Appellant,

v.

H2O.AI, INC.,

Defendant – Appellee.

ON APPEAL FROM THE UNITED STATES DISTRICT COURT FOR THE NORTHERN DISTRICT OF CALIFORNIA, CASE NO. 3:17-CV-03049-WHO

REPLY BRIEF OF APPELLANT

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INTRODUCTION

The district court found the appealed claims ineligible under 35 U.S.C. § 101 after erroneously characterizing the scope of the claimed invention. Defendant's characterization of the claims is not tied to the scope of what is actually claimed. Moreover, there are underlying issues of fact regarding whether the claims describe well-understood, routine, and conventional activities. The claims are directed to an improvement in computer functionality and the technical field of predictive data processing.

Defendant failed to meet its burden to demonstrate invalidity by clear and convincing evidence and the district court did not apply the clear and convincing evidence standard when it granted defendant's motion to dismiss. At a minimum, there are at least underlying issues of fact regarding whether the claimed subject matter involves such an improvement. The claims recite concrete, patent-eligible subject matter that is not abstract, conventional, or preemptive. Furthermore, the district court's preemptive refusal to allow plaintiff to amend the complaint as futile where it was issuing an order of dismissal without the benefit of claim construction was improper.

Accordingly, reversal is warranted. At a minimum, the dismissal order should be vacated and plaintiff should be provided an opportunity to amend the complaint.

ARGUMENT

The appealed claims satisfy § 101's eligibility requirements because they do not preempt an abstract idea. The primary issue under § 101 is how to characterize the appealed claims. The claims recite *a particular* metadata structured predictive ensemble and a predictive analytics factory for producing the claimed predictive ensemble. This is supported by the specification and tied to the claim elements. This is a significant improvement to the function of computer data processing and the field of predictive analytics technology. The claims do not preempt the computer generation of all learned functions and do not cover all predictive ensembles. Thus, the district court's order of dismissal should be reversed.

I. CLAIM 14 IS NOT REPRESENTATIVE OF ALL CLAIMS

Defendant bases its response entirely on arguments against the validity of claim 14, wholly ignoring independent claims 1, 17, and 23. Defendant repetitively and erroneously asserts that "PurePredictive does not dispute that Claim 14 is representative of the other independent claims." RB[1] at 8. To the contrary, plaintiff disputes that claim 14 is representative and "never agreed to make claim [14] representative." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018). In its opposition brief to H2O.ai's motion to dismiss, PurePredictive contended that claim 14 was not representative:

[1] All references to RB ("Red Brief") are to H2O.ai's Response Brief.

> The Motion to Dismiss incorrectly cherry-picks claim 14 (which does not claim modules related to computer related technology), does not consider the claims "in light of the specification[,]" and conveniently ignores the clear direction of the claim and "[its] character as a whole . . . ."

Appx158:16–29 (citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1335 (Fed. Cir. 2016) (internal citations omitted)).

PurePredictive also separately argued the relevance of distinct claim limitations of independent claims 1, 17, and 23 apart from claim 14 in its opposition brief to H2O.ai's motion to dismiss. For example, PurePredictive argued:

> Claims 1 and 23 clearly state the use of modules, which may be implemented as hardware circuits, software, or a combination of hardware and software. See '446 Patent at 3:32–65. The use of these modules throughout both the claims and the specification shows that the claims are directed toward computer-related technology.

Appx157:20–23.

PurePredictive also distinguished claim 17 from claim 14 when it argued in its opposition brief:

> Claim 17, a claim directed to a computer-program product, is also clearly directed toward computer-related technology. . . .
> The Federal Circuit has found computer program product claims similar in nature to Claim 17 to be valid and infringed.

Appx157:24–158:4 (citing *z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1356 (Fed. Cir. 2007)).

PurePredictive further argued the distinctiveness of claim language of other independent claims from claim 14 during the hearing on defendant's motion to dismiss. For example, PurePredictive argued:

> If you look at the patent, particularly Claims 1 and 23, there are multiple references to the use of modules throughout these claims. . . . All of the modules listed and contemplated arise in the context of computer technology.

Appx198:14-22.

Indeed, the order of dismissal also recognized that PurePredictive raised arguments regarding distinct claim language of claims 1, 17, and 23 regarding modules and computer program products. Appx10:14–18

On appeal, PurePredictive separately argued the validity of claims 1, 17, and 23 in addition to claim 14. *See*, *e.g.*, BB[2] at 55-59. Moreover, PurePredictive contested the use of claim 14 by the district court to make broad, conclusory generalizations about all of the independent claims without any "meaningful discussion regarding the actual claim language or the meaning of the claim terms considered in view of the specification." BB at 39. As noted in PurePredictive's appeal brief: This overbroad abstraction ***does not account for core features of the claims***. BB at 39 (emphasis added).

[2] All references to BB ("Blue Brief") are to PurePredictive's Appeal Brief.

Under similar circumstances, *Berkheimer* held that the plaintiff preserved its right to separately argue the validity of different claims. *Berkheimer*, 881 F.3d at 1365-1366. The plaintiff had not agreed to make a claim representative, argued in its opposition to summary judgment that the claim was not representative, included arguments in the opposition brief regarding distinguishing features of claims, and on appeal independently argued for the validity of other claims. *Id.* at 1365. Under these circumstances, *Berkheimer* held Mr. Berkheimer preserved his right to separately argue the validity of different claims. The same facts/circumstances exist in this case.

Accordingly, the Court should not treat claim 14 as representative and should evaluate each of the appealed claims on their own merits.

II. ALICE STEP 1 – THE APPEALED CLAIMS DO NOT PREEMPT AN ABSTRACT IDEA

The sole justification for judicially created exceptions to § 101 is that patent claims should not preempt the fundamental tools of discovery that must remain "free to all . . . and reserved exclusively to none." *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948). Preemption is "the concern that drives" § 101 jurisprudence. *Alice Corp. Pty. Ltd. v. CLS Bank Intern.*, 134 S. Ct. 2347, 2354 (2014); *see also Bilski v. Kappos*, 561 U.S. 593, 611-12 (2010). The appealed claims do not preempt an abstract idea. The dismissal order improperly found the claims directed to an abstract idea by overlooking core features described in the claim language.

The appropriate § 101 analysis requires viewing the claim as a whole, and not individual limitations. *Diamond v. Diehr*, 450 U.S. 175, 188-89 (1981); *King Pharms., Inc. v. Eon Labs, Inc.*, 616 F.3d 1267, 1277 (Fed. Cir. 2010). "[I]t is irrelevant that any individual step or limitation of such processes by itself would be unpatentable under § 101." *In re Bilski*, 545 F.3d 943, 958 (Fed. Cir. 2008).

The specific predictive analytics factory and metadata structured predictive ensemble covered by the appealed claims do not preempt the field of predictive learned functions or predictive data analytics.

Thus, the district court's order of dismissal should be reversed.

A. The claims do not preempt all applications of a mathematical process

Defendant argues that the claims preempt all applications of a mathematical process. RB at 24. In support of this position, defendant repeatedly cites a passage from the specification (which was relied upon by the district court): "Beneficially, such an apparatus, system, method, and computer program product would comprise a predictive analytics factory configured to generate a predictive ensemble regardless of the particular field or application." Appx24, 1:41-44.

Defendant mischaracterizes this passage to mean that the claims cover all applications of a mathematical process or any computer generation of learned functions. This interpretation overlooks the fact that the claims do not generally cover learned functions by themselves; rather, they cover particular predictive ensembles

and particular predictive analytics factories that form these predictive ensembles. Indeed, the appealed claims do ***not*** cover all predictive analytics factories or all predictive ensembles. And plaintiff has never asserted such a broad interpretation.

Defendant attempts to obfuscate the difference between being able to apply a claimed invention to different fields and being able to preempt all applications of an abstract idea. For example, a novel removable handle grip for a hammer may have a wide variety of applications and could easily be said to be useful regardless of the particular field or application. It could be used on a claw hammer, sledgehammer, framing hammer, ball-peen hammer, garden pick, etc. It may be used in commercial or residential construction or for home use. Stating that the novel handle grip is useful "regardless of the particular field or application" does not mean that a corresponding claim covering the novel handle grip would cover all handle grips and certainly would not render the subject matter of the hammer handle grip patent ineligible under § 101.

Likewise, the passage cited by defendant should not be read to imply that the claims cover all predictive analytics factories or all predictive ensembles. The claim language delineates the scope of the claims and that language is not so broad as to cover all predictive ensembles or predictive analytics factories. *See Ruckus Wireless, Inc. v. Innovative Wireless Sol's, LLC*, 824 F.3d 999, 1004 (Fed. Cir. 2016) (claims should be read to preserve their validity).

For example, claim 1 only covers a predictive analytics factory that forms a "predictive ensemble comprising a subset of multiple learned functions from the plurality of learned functions" where the multiple learned functions are "selected and combined based on the evaluation metadata" and the predictive ensemble comprises a "rule set synthesized from the evaluation metadata to direct data through the multiple learned functions such that different learned functions of the ensemble process different subsets of the data based on the evaluation metadata." Appx34-35. As shown below, there are a number of predictive analytics factories and predictive ensembles that do not fall within claim 1.

Furthermore, the claimed predictive analytics factory is not merely manipulating mathematical formulas. Rather it is configured to generate and combine evaluative metadata with multiple synthesized learned functions to create the metadata structured environment of a predictive ensemble that more effectively and efficiently processes predictive data. Similarly, the claimed predictive ensemble is not a mathematical formula. Rather, it is a metadata structured[3]

[3] Defendant also argues that PurePredictive waived any arguments regarding the claims covering data structures. As discussed below, PurePredictive's characterization of the claims has not been that they merely cover a data structure, but cover a metadata structured arrangement of combined learned functions and a predictive analytics factory that produces them. PurePredictive discussed the metadata relationship of the predictive analytics factory and ensembles, as well as their advantages, in its opposition brief and oral argument below. *See, e.g.*, Appx157:9–15, Appx165:3-13, Appx166:18–21, Appx196:23-197:8.

arrangement of combined, synthesized learned functions for processing predictive data including a metadata rule set that directs different subsets of data to different combined learned functions. Thus, metadata is used to define relationships within the claimed predictive ensemble so that different classes or subsets of data are processed by different combined learned functions.

Other predictive ensembles do not do this. For example, a predictive ensemble using a linear voting system does not assign different subsets of predictive/workload data to different combined learned functions for processing. Instead, each function in the voting ensemble is given the same data for processing. Appx303–304. In fact, during prosecution of the '446 Patent[4], the applicant amended the claims to clarify that the claimed predictive ensemble did not cover voting ensembles. As noted in an After Final Amendment and Response to Office Action (pgs. 15-16), the '446 Patent applicant stated:

> The present amendments clarify that the synthesized rule set directs data such that different learned functions of the ensemble process different subsets of the data, such as different features/columns of

[4] Defendant argues that PurePredictive waived arguments relying on prosecution history. But the prosecution history was discussed various times during oral argument before the district court on H2O's motion to dismiss. For example, PurePredictive argued the significance of prior art raised by the USPTO and of the USPTO's evaluation of the prior art. (Appx201; Appx203) Likewise, PurePredictive argued the significance of other aspects of the prosecution history, including the fact that "the USPTO has found . . . that claims at issue here are not directed to an abstract idea." (Appx195; Appx203). In any event, the prosecution history is intrinsic evidence that is responsive to arguments raised by Defendant on appeal.

> data, different rows/instances of data, or both. . . . The ensemble methods mentioned in Fig. 13 of Richter, however, "voting," "average," "weighted average," and "hueristic rules" [sic.] do not distinguish between learned functions, with all learned functions processing all data. Richter does not teach any synthesized rules for directing data through multiple learned functions of an ensemble so that different learned functions process different subsets of the data.

Appx303–304.

The distinction between the ‘446 predictive ensemble and a voting ensemble reflects a significant improvement in predictive data processing technology.

Defendant argues that at oral argument PurePredictive expressly disclaimed the idea that the claimed predictive ensemble “provides a structured data processing environment.” As evidence, defendant quotes a limited portion of an exchange between plaintiff’s counsel, Mr. Jeremy Adamson, and the district court. However, the portion quoted by defendant omits a key part of the exchange that clarifies the discussion.

> MR. ADAMSON: I agree. We're not talking about data structures. *Enfish* was about data tables and self-referencing tables versus having individual tables where data was handled a different way. That's not what this patent is about. This patent is about predictive learning and machine learning functions and modules, so -- yeah. We're –
>
> THE COURT: ***It's a distinction without a difference?***
>
> MR. ADAMSON: ***Exactly.***

Appx212:11–19 (emphasis added).

When the exchange is viewed in full, it becomes clear that no admission was made that the appealed claims do not involve data related structures. The discussion was directed specifically to the self-referential data structures of *Enfish*. The claimed predictive ensemble is not strictly a data structure and it is not strictly learned functions. It is both. It is a structured environment for data processing comprising data structured relationships among synthesized/combined learned functions. Thus, the question regarding "data structures" was "a distinction without a difference", as noted by the district court and confirmed by plaintiff's counsel.

Defendant's argument is a red herring, because the term "data structure" is never used in plaintiff's appeal brief. That is because Plaintiff characterizes the predictive ensemble to include the metadata structuring of combined learned functions, not just data. Thus, there is a metadata structured environment for processing workload data comprising structured relationships among both evaluative metadata and different synthesized/combined learned functions. Again, the predictive ensemble is not strictly a data structure, but it comprises metadata structured relationships among combined synthesized learned function. Accordingly, *Enfish* still applies.

As such, plaintiff did not disclaim a data structured environment for predictive data processing. Accordingly, the appealed claims are directed to patent eligible subject matter under § 101.

B. The Appealed Claims are Necessarily Rooted in Computer Technology

The appealed claims are not, as defendant argues, purely directed to the manipulation of data in the abstract. RB at 2. Defendant argues that the claims are "not tied to any computer, software, algorithm, data, metadata, or kind of prediction." RB at 3. Indeed, defendant construes the claims so, in defendant's words, they "can literally be infringed by the acts of a human sitting alone in a dark room, or (at a minimum) someone who is writing equations down on the back of a napkin." RB at 15.

Defendant's position demonstrates how far removed its interpretation of the claims is from the actual language of the claims. The claimed technology is necessarily rooted in computer technology and overcomes problems arising in the realm of computer networks. Even the district court acknowledged that the claims involved the use of computer hardware/software. Appx10:14–17, Appx11:4–5.

Contrary to defendant's claim interpretation, Claim 1 cannot be infringed by acts of a human sitting alone in a dark room or writing equations down on a napkin. Claim 1 is directed to a predictive analytics factory *for forming a predictive ensemble* consistent with the '446 Patent. Claim 1 specifically requires computer hardware/software for implementation. The apparatus of claim 1 includes "a receiver module . . .; a function generator module . . .; a function evaluator module . . .; and a predictive compiler module configured to form the

predictive ensemble, the predictive ensemble comprising . . . a rule set synthesized from the evaluation metadata to direct data through the multiple learned functions such that different learned functions of the ensemble process different subsets of the data based on the evaluation metadata." (Appx34, 22:56 – Appx35, 23:18) (emphasis added).

As explained in the '446 Patent:

> a module may be implemented as a hardware circuit . . . . A module may also be implemented in programmable hardware devices . . . .
>
> Modules may also be implemented in software for execution by various types of processors. . . . .

(Appx25, 3:35-47)

Likewise, claim 23 cannot be infringed by acts of a human sitting alone in a dark room or writing equations down on a napkin. Claim 23 is directed to *a predictive ensemble* consistent with the '446 specification and requires the use of computer hardware/software. For example, claim 23 includes: "an orchestration module configured to direct the data through the different learned functions of the multiple learned functions based on the synthesized metadata rule set to produce the result." (Appx36, 26:4-19) (emphasis added).

Similarly, claim 17 cannot be infringed by acts of a human sitting alone in a dark room or writing equations down on a napkin. Claim 17 is directed to a "***computer program product***" *for forming a predictive ensemble* consistent with

the '446 specification. Thus, defendant's interpretation is inconsistent with the language of claim 17, which states in relevant part: "A computer program product comprising a non-transitory computer readable storage medium storing computer usable program code . . ." (Appx35, 24:54–57).

Defendant also construes claim 14 inconsistent with the actual claim language. Claim 14 is directed to the method for a predictive analytics factory *for forming a predictive ensemble.* (Appx35, 24:21-41)(emphasis added). The predictive analytics factory of claim 14 is necessarily implemented by computer hardware and software and rooted in computer technology. A predictive analytics factory, as shown in FIG. 4 of the '446 Patent, comprises and operates using various computer modules. Appx19. The predictive ensemble of claim 14 is comprised of a plurality of learned functions (per the claim language) in a structured combination that is defined by a synthesized metadata rule set to "direct different subsets of the workload data through different learned functions of the multiple learned functions based on the evaluation metadata." Appx35, 24:38–41.

The learned functions of claim 14 are defined in the '446 specification: "A learned function, as used herein, comprises a computer readable code that accepts an input and provides a result." Appx27, 8:50–51. A learned function "may comprise a compiled code, a script, text, a data structure, a file, a function, or the like," and may be generated "using parallel computing on multiple processors,

such as a massively parallel processing (MPP) system or the like." Appx27, 8:51–53, 7:31–35. The specification also states that the evaluation metadata is stored in a metadata library where it can be accessed using "an API, a shared library, one or more function calls, or the like." Appx32, 17:21–23. Furthermore, the evaluation metadata may be stored "in a database format . . . or as one or more other data structures" and may be indexed "by learned function, by feature, by instance, by training data, by test data, by effectiveness, . . . and may provide query access to the indexed evaluation metadata." Appx32, 17:25–32. The learned functions are generated, executed, and analyzed on computers, as described above, and the evaluation metadata is necessarily collected and stored on a computer.

Everything about claim 14 is rooted in computer technology and improves the processing of predictive analytics data by "direct[ing] different subsets of the workload data through different learned functions of the multiple learned functions based on the evaluation metadata." Appx35, 24:38-41.

Thus, the appealed claims are not directed to an abstract idea and the district court's order of dismissal should be reversed.

III. ALICE STEP 2 – THE CLAIMS RECITE A PATENT-ELIGIBLE APPLICATION

Step two of the Alice/Mayo framework assumes that the court has found that the patent claims are directed to an abstract idea at step one. Here, the claims are not directed to an abstract idea. But even assuming the patent is directed to an

abstract idea, the claims recite significantly more than the purported idea of manipulating mathematical formulas.

The inquiry at step 2 looks to the presence of "an element or combination of elements that is 'sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.'" *Alice*, 134 S. Ct. at 2355 (quoting *Mayo Collaborative Servs. v. Prometheus Labs. Inc.*, 132 S. Ct. 1289, 1394 (2012)). "The second step of the Alice test is satisfied when the claim limitations involve more than performance of well-understood, routine, [and] conventional activities previously known to the industry." *Berkheimer*, 881 F.3d at 1367 (internal citations omitted).

Further, even if a claim includes an algorithm, it is not improperly abstract if the algorithm is combined with other elements to accomplish a particular goal. *See, e.g.*, *Parker v. Flook*, 437 U.S. 584, 590 (1978) ("a process is not unpatentable simply because it contains a law of nature or a mathematical algorithm"); *Diehr*, 450 U.S. at 187; *California Inst. of Tech. v. Hughes Commc'ns Inc.*, 59 F. Supp. 3d 974, 991 (C.D. Cal. 2014).

Here, the district court's dismissal order fundamentally errs because the claims do not simply implement math. Rather, they involve a metadata structured arrangement of combined learned functions that allows control of the flow of different subsets of workload data to different classes of combined learned

functions. Thus, it improves the efficiency and effectiveness of predictive data processing. This is tied directly to '446 Patent claim language covering a predictive ensemble comprising:

> multiple learned functions . . . selected and combined based on the evaluation metadata . . ., the predictive ensemble comprising a rule set synthesized from the evaluation metadata to direct data through the multiple learned functions such that different learned functions of the ensemble process different subsets of the data based on the evaluation metadata.

Appx35, 23:10–18; *see McRO, Inc. v. Bandai Namco Games America, Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) ("[w]e therefore look to whether the claims in these patents focus on a specific means or method that improves the relevant technology") (citing *Enfish*, 822 F.3d at 1336 and *Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1048 (Fed. Cir. 2016)) (emphasis added).

The metadata structured arrangement of combined learned functions is comparable to the "self-referential" database model held as patent eligible in *Enfish*. *Enfish*, 822 F.3d at 1330-33, 1346. In *Enfish*, the patents-at-issue covered a logical model for a computer database that defined how the various elements of information in the database are related to each other. *Id.* at 1330. This Court held that claims covering this "self-referential" feature were patent eligible under § 101. *Id.* at 1346. The predictive ensemble feature claimed in the '446 Patent likewise is a metadata structured environment that defines how various elements of information (e.g., subsets of data) are related to various combined learned functions.

Defendant argues that the appealed claims merely cover the performance of well-understood, routine, and conventional activities previously known to the industry. RB at 27. But defendant proffers no evidence to show that a metadata structured arrangement of combined learned functions using evaluative metadata is "well-understood, routine and conventional" – particularly where the predictive ensemble is structured to direct different subsets of data to different combined learned functions for processing of different data by different learned functions. Defendant merely proffers conclusory allegations. At a minimum, there are issues of fact from the specification and intrinsic evidence that were raised below by PurePredictive that preclude dismissal of the complaint with prejudice.[5]

Defendant argues that improvements to the field of predictive data processing cited by plaintiff are not tied to claim language. Defendant's argument is erroneous. The following chart shows recited improvements, claim language associated with the improvements, and examples from the '446 specification where discussed.

[5] Defendant also argues that its conclusory allegations are sufficient and that *Berkheimer* and *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121 (Fed. Cir. 2018) are not applicable because PurePredictive purportedly did not raise fact issues below. To the contrary, in its opposition brief and at oral argument, PurePredictive made numerous assertions regarding facts/evidence found in the '446 specification that the claims do not cover routine or conventional processes. *See, e.g.*, Appx156: 19–21, Appx157:9–15, Appx162:4–9, Appx162:23–163:2, Appx163:18-164:2, Appx165:3-13, Appx166:18–21, Appx196:23-197:8, Appx213:17–214:12.

Improvement/Advantage	Claim Language	Specification
(1) division of workload data-processing, providing for quicker more efficient processing of data	Claims 1 and 14: the predictive ensemble comprising a subset of multiple learned functions . . . selected and combined based on the evaluation metadata . . ., the predictive ensemble **comprising a rule set synthesized from the evaluation metadata to direct data through the multiple learned functions such that different learned functions of the ensemble process different subsets of the data based on the evaluation metadata** Claim 17: the predictive ensemble comprising at least two learned functions . . . , the at least two learned functions . . . selected and combined based on the evaluation metadata, the predictive ensemble **comprising a rule set synthesized from the evaluation metadata to direct data through the at least two learned functions so that different learned functions process different features of the selected subset of features.**	the synthesized metadata rule set 322 comprises a set of rules or conditions from the evaluation metadata of the metadata library 314 that indicate to the orchestration module 320 which features, instances, or the like should be directed to which synthesized learned function 324 (Appx32, 18:23-28) The synthesizer module 310 may use that evaluation metadata to determine rules for the synthesized metadata rule set 322, indicating which features, which instances, or the like the orchestration module 320 the orchestration module 320 [sic] should direct through which learned functions, in which order, or the like. (Appx32, 18:33-39)

(1) division of workload data-processing, providing for quicker more efficient processing of data	Claim 23: **a metadata rule set synthesized from the evaluation metadata** for the plurality of learned functions **for directing data through different learned functions of the multiple learned functions to produce a result**; and **an orchestration module configured to direct the data through the different learned functions of the multiple learned functions based on the synthesized metadata rule set to produce the result**.	The orchestration module 320 . . . is configured to direct workload data through the predictive ensemble 304 . . . [and] uses evaluation metadata from the function evaluator module 312 and/or the metadata library 314, such as the synthesized metadata rule set 322, to determine how to direct workload data through the synthesized learned functions 324 of the predictive ensemble 304. (Appx32, 18:11-22)

(2) Generation of effective predictive ensembles without intervention of data scientists, experts, or users	Claim 1: a function generator module configured to pseudo-randomly **generate a plurality of learned functions based on the training data without prior knowledge regarding suitability of the generated learned functions for the training data**; Claim 14: pseudo-randomly generating a plurality of learned functions based on training data **without prior knowledge regarding suitability of the generated learned functions for the training data, the training data received for forming a predictive ensemble**" Claim 23: wherein the larger plurality of learned functions are generated pseudo-randomly from training data without prior knowledge of a suitability of the larger plurality of learned functions for the training data See similar language in claim 17	The predictive analytics module 102 . . . generates predictive ensembles for the clients 104, **with little or no input from a Data Scientist or other expert**. (Appx27, 7:14-16) provide[s] predictive ensembles that are customized and finely tuned for data from a specific client 104, **without excessive intervention or fine-tuning**. (Appx27, 7:29-31) **eliminates or minimizes the role of a Data Scientist or other expert in generation of a predictive ensemble**. (Appx28, 10:8-10)

(3) More effective and efficient predictive ensembles	Claim 1: a function evaluator module configured to perform an evaluation of the plurality of learned functions using test data and to maintain evaluation metadata for the plurality of learned functions, the evaluation metadata comprising one or more of an indicator of a training data set used to generate a learned function and an indicator of one or more decisions made by a learned function during the evaluation . . . the multiple learned functions selected and combined based on the evaluation metadata Claim 14: **evaluating the plurality of learned functions using test data to generate evaluation metadata indicating an effectiveness of different learned functions** at making predictions based on different subsets of the test data…**the subset of multiple learned functions selected and combined based on the evaluation metadata.**	the predictive compiler module 206 . . . may iteratively increase the number of features used to generate predictive ensembles 304 **until an increase in effectiveness or usefulness of the results of the generated predictive ensembles 304 fails to satisfy a feature effectiveness threshold**. By increasing the number of features until the increases stop being effective . . . the predictive compiler module 206 **may determine a minimum effective set of features for use in a predictive ensemble 304, so that generation and use of the predictive ensemble 304 is both effective and efficient**. (Appx29, 12:39-51) the function generator module 204 ensures that at least a subset of the generated learned functions,

(3) More effective and efficient predictive ensembles	Claim 17: selecting a subset of the features of the training data based on evaluation metadata generated for the plurality of learned functions, the evaluation metadata comprising an effectiveness metric for a learned function . . . at least two learned functions selected and combined based on the evaluation metadata Claim 23: a metadata rule set synthesized from the evaluation metadata for the plurality of learned functions for directing data through different learned functions of the multiple learned functions to produce a result	either individually or in combination, **are useful, suitable, and/or effective for the training data** without careful curation and fine tuning by a Data Scientist or other expert. (Appx28, 9:61-65) At each iteration, the function evaluator module 312 may **determine an overall effectiveness of the learned functions** in aggregate for the current iteration's selected combination of features. (Appx30, 13:11-14) the metadata library 314 **may index evaluation metadata** by learned function, by feature, by instance, by training data, by test data, **by effectiveness**, and/or by another category 30 or attribute and may provide query access to the indexed evaluation metadata. (Appx32, 17:28-32)

(4) Excludes or reduces noise from predictive ensembles	See recited claim language for claims 1, 14, 17, and 23 associated with improvement/advantage (3) above.	In a further embodiment, **based on evaluation metadata** from the metadata library 314, the feature selector module 302 **determines which features from initialization data and/or training data are adding noise**, are not predictive, are the least effective, or the like, **and excludes the features from the predictive ensemble**. (Appx29, 12:66 – Appx30, 13:4)
(5) Optimizes overhead of predictive ensembles	See recited claim language for claims 1, 14, 17, and 23 associated with improvement/advantage (3) above.	See specification at Appx29, 12:66 – Appx30, 13:4 quoted above for improvement (4). See also specification at Appx29, 12:39-51 quoted above for improvement (3).

(6) Higher and optimized confidence metrics	See recited claim language for claims 1, 14, 17, and 23 associated with improvement/advantage (3) above.	The predictive correlation module 318 **determines one or more features, instances of features, or the like that correlate with higher confidence metrics** (e.g., that are most effective in predicting results with high confidence). The predictive correlation module 318 **may cooperate with, be integrated with, or otherwise work in concert with the feature selector module 302 to determine one or more features, instances of features, or the like that correlate with higher confidence metrics**. For example, as the feature selector module 302 causes the predictive compiler module 206 to **generate and evaluate learned functions with different sets of features, the predictive correlation module 318 may determine**

(6) Higher and optimized confidence metrics	See recited claim language for claims 1, 14, 17, and 23 associated with improvement/advantage (3) above.	**which features and/or instances of features correlate with higher confidence metrics, are most effective, or the like based on metadata from the metadata library 314**. (Appx30, 13: 19-34)

Thus, contrary to defendant's assertions, the improvements to predictive data processing are tied to language of the claims. At minimum, the appealed claims are patent eligible under *Alice* Step 2.

Accordingly, the order of dismissal should be reversed.

IV. THE DISMISSAL ORDER FAILED TO APPLY THE CLEAR AND CONVINCING EVIDENCE STANDARD; THERE ARE MATERIAL ISSUES OF FACT

The district court legally erred by not applying the "clear and convincing" evidence standard when it held the claims of the '446 Patent invalid. "[W]hether a claim recites patent eligible subject matter is a question of law which may contain underlying facts." *Berkheimer*, 881 F.3d at 1368 (citing *Akzo Nobel Coatings, Inc. v. Dow Chem. Co*., 811 F.3d 1334, 1343 (Fed. Cir. 2016)). "***Any fact*** . . . that is pertinent to the invalidity conclusion must be proven by clear and convincing evidence." *Id.* (citing *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 95, 131 S. Ct. 2238, 180 L. Ed.2d 131 (2011)) (emphasis added).

Defendant attempts to distinguish *Berkheimer* by alleging that plaintiff has not identified any "inventive" concept having a structural claim element, such as a "data file."[6] However, as noted above, plaintiff identified several inventive concepts captured by the claim language, which include structural elements. The metadata structured arrangement of combined learned functions comprising the predictive ensemble is structural. Moreover, defendant proffers no evidence to show that this metadata structured arrangement of combined learned functions is "well-understood, routine and conventional" – particularly where the predictive ensemble is structured to direct different subsets of data to different combined learned functions for processing by the different learned functions. Defendant merely proffers conclusory allegations. At a minimum, there are issues of fact that preclude dismissal of the complaint with prejudice.

Defendant argues that the "district court did not reject any factual assertion made by PurePredictive about the novelty of its purported invention, but instead found that its 'solutions remain the abstract mathematical processes of collecting

[6] Defendant also argues that its conclusory allegations are sufficient and that *Berkheimer* and *Aatrix* are not applicable because PurePredictive did not purportedly raise fact issues below. To the contrary, in its opposition brief and at oral argument, PurePredictive made numerous assertions regarding facts/evidence found in the '446 specification that the claims do not cover routine or conventional processes. *See, e.g.*, Appx156: 19–21, Appx157:9–15, Appx162:4–9, Appx162:23–163:2, Appx163:18-164:2, Appx165:3-13, Appx166:18–21, Appx196:23-197:8, Appx213:17–214:12.

and analyzing data.'" RB at 33. But in doing so the district court had to make a factual determination regarding whether the invention was routine or conventional. The district court held that the claims "make use of computers only as tools, rather than provide a specific improvement on a computer-related technology." Appx2. The district court acknowledged Plaintiff's fact-based arguments that the "claims contain both an unconventional improvement in its field and an inventive concept through its ordered combination." Appx11. But the district court held the claims invalid despite a factual dispute regarding whether or not the claims merely covered implementation of routine, well-known processes.

"The question of whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact." *Berkheimer*, 881 F.3d at 1368. "The improvements in the specification, to the extent they are captured in the claims, create a factual dispute regarding whether the invention describes well-understood, routine, and conventional activities." *Id*. at 1369 (citing *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1347-48 (Fed. Cir. 2014)).

The '446 specification recites numerous improvements to the field of predictive data processing technology. As demonstrated above, these improvements are tied to the claim language. Thus, there is a "factual dispute

regarding whether the invention describes well-understood, routine, and conventional activities." *Id.*

Accordingly, the dismissal order should be reversed.

V. IT WAS IMPROPER FOR THE DISTRICT COURT TO PREEMPTIVELY REFUSE PUREPREDICTIVE AN OPPORTUNITY TO AMEND THE COMPLAINT WHERE THE COURT DISMISSED THE COMPLAINT WITH PREJUDICE WITHOUT THE BENEFIT OF CLAIM CONSTRUCTION

The district court's refusal to allow PurePredictive any opportunity to amend its Complaint was in error. Defendant argues that any amendment to the Complaint would be futile. RB at 36. Defendant's argument is based on its erroneous characterization of claim 14, untethered from the language of the claim, and its improper treatment of claim 14 as representative of all other claims. *See, e.g.*, RB at 34–35. But the district court's preemptive refusal to permit even a first amended complaint, where the dismissal was decided without the benefit of claim construction, was in error.

In the Ninth Circuit, dismissal of a complaint without leave to amend is improper unless it is clear, upon *de novo* review that the complaint could not be saved by any amendment. *See AE ex rel. Hernandez v. County of Tulare*, 666 F.3d 631, 636 (9th Cir. 2012); *Thinket Ink Info. Res., Inc. v. Sun Microsystems, Inc.*, 368 F.3d 1053, 1061 (9th Cir. 2004).

Federal Rule of Civil Procedure 15(a) provides that leave to amend a pleading "shall be freely given when justice so requires." The United States Supreme Court and the Ninth Circuit have repeatedly reaffirmed that leave to amend is to be granted with "***extreme liberality***." *DCD Programs, Ltd. v. Leighton*, 833 F.2d 183, 186 (9th Cir. 1987) (citation omitted) (emphasis added); *see, e.g.*, *Foman v. Davis*, 371 U.S. 178, 182, 83 S. Ct. 227, 230 (1962) (leave to amend should be freely given); *Eminence Capital, LLC v. Aspeon, Inc.*, 316 F.3d 1048, 1052 (9th Cir. 2003) ("Absent prejudice, or a strong showing of any of the remaining *Foman* factors, there exists a presumption under Rule 15(a) in favor of granting leave to amend.") (emphasis in original); *United States v. Webb*, 655 F.2d 977, 979 (9th Cir. 1981) (courts should be guided by policy favoring decisions on the merits "rather than on the pleadings or technicalities"); *Cooper Development Co. v. Employers Insurance of Wausau*, 765 F. Supp. 1429, 1432 (N.D. Cal. 1991) (courts have been "quite liberal" in granting leave to amend); *see also* Moore, 3-15 Moore's Federal Practice - Civil § 15.14 ("A liberal, pro-amendment ethos dominates the intent and judicial construction of Rule 15(a).").

In *Aatrix Software*, the Federal Circuit found that the district court erred when it dismissed a complaint under § 101 and refused the plaintiff an opportunity to amend the complaint (*i.e.*, a second amended complaint), without claim construction. *Aatrix Software*, 882 F.3d at 1125.

The district court in this case erroneously applied an overbroad abstraction of claim 14 to all claims, ***without any claim construction***, to hold all claims invalid, and then refused any opportunity to amend the complaint – despite the fact that PurePredictive had not yet made any amendments to the complaint and had raised concerns that no claim construction had been conducted.

During the hearing on defendant's motion to dismiss, PurePredictive emphasized "the importance of the claim construction process in determining whether claims are actually patent eligible or not." Appx193:24–194:2. PurePredictive further expressed its concern that the district court was not going to evaluate evidence "as to how the claims should be construed here" before deciding the motion to dismiss. Appx194:4–5. As noted by PurePredictive at the hearing: "it would be unreasonable to do so to supplant the USPTO's judgment on this patent at this early stage in the litigation without any benefit of the type of analysis that would come through claim construction." Appx194:15–18.

The Federal Circuit has noted that "the need for claim construction might be apparent just from the claim terms themselves, to arrive at 'a full understanding of the basic character of the claimed subject matter.'" *Aatrix Software*, 882 F.3d at 1128, quoting *Bancorp Servs., L.L.C. v. Sun Life Assur. Co. of Canada (U.S.)*, 687 F.3d 1266, 1273–74 (Fed. Cir. 2012). The need for claim construction in the

present case is abundantly apparent as demonstrated in Appellant's opening brief. *Aatrix Software,* 882 F.3d at 1129.

Thus it was improper for the district court to dismiss Plaintiff's complaint without the benefit of claim construction and without any opportunity to amend the complaint. There are numerous issues of fact regarding claim language having a bearing on validity under § 101. Accordingly, the district court's order of dismissal should be reversed.

Alternatively, the dismissal order should be vacated and Plaintiff should be provided an opportunity to amend its complaint. *Aatrix Software*, 882 F.3d at 1129 ("The briefing and argument on appeal demonstrate a need for claim construction, to be conducted on remand after the amended complaint is filed.").

CONCLUSION AND STATEMENT OF RELIEF SOUGHT

For the reasons stated herein, PurePredictive respectfully requests that this Court reverse the final judgment entered by district court and hold each of the claims-at-issue patent eligible under § 101. Alternatively, the dismissal order should be vacated and Plaintiff should be provided an opportunity to amend its complaint.

Dated: May 4, 2018

Respectfully submitted,

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CERTIFICATE OF FILING AND SERVICE

I hereby certify that, on May 4, 2018, I electronically filed the foregoing APPELLANT'S REPLY BRIEF with the Clerk of Court using the CM/ECF System, which will send notice of such filing to all registered users.

I further certify that, upon acceptance and request from the Court, the required paper copies of the foregoing will be deposited with United Parcel Service for delivery to the Clerk, UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, 717 Madison Place, N.W., Washington, D.C. 20439.

The necessary filing and service were performed in accordance with the instructions given to me by counsel in this case.

Dated: May 4, 2018

/s/ Priscilla C. Winkler

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